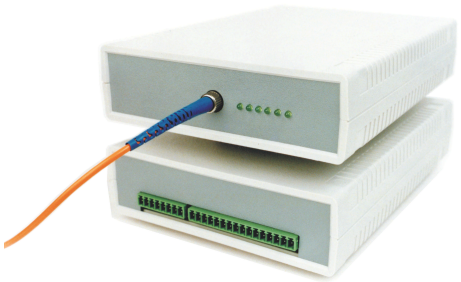
ALF TECH

FIBRE DIGITAL AUDIO TRANSCEIVER

# User's Manual



**Electrostatic Discharge:** The product can be damaged by electrostatic discharge, thus care must be taken when handling the product. Failure to observe proper handling and installation procedures can cause damage. Electrostatic Discharge damage can range from performance degradation to complete product failure.

**Important Safety Instructions**
**Please follow these precautions when using this product:**

Read these instructions. Keep these instructions. Heed all warnings. Follow all instructions.

**WATER AND MOISTURE:** Designed for indoor use only. The product is not protected against liquids. It should not be exposed to dripping or splashing and no objects filled with liquids, shall be placed on the product.

**INSTALLATION:** The product must always be installed by qualified service personnel. Install in accordance with the manufacturer's instructions. Always disconnect the supply power before installing the product. Do not install near any heat sources such as radiators, heaters, or other apparatus that produce heat.

**POWER SOURCES:** The product should be connected to a power supply only of the type described in the operating instructions or as marked on the unit.

**SERVICING:** Contains no user serviceable parts. Do not attempt to repair the product, as this will void the warranty.

**FUSING:** Never bypass or use any other type of fuse. Replace only with the same type of fuse as found in the operating instructions. Fuses must only be replaced by qualified service personnel. Always disconnect from power before replacing fuses.

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| | | |
|---|---|---|
| **Product Name:** | **FDAT-EN2** | FDAT-TX Transmitter |
| | | FDAT-RX Receiver |
| **Printed:** | February, 2005 | Product User's Manual |

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# Users Manual

# FIBRE DIGITAL AUDIO TRANSCEIVER

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# Introduction

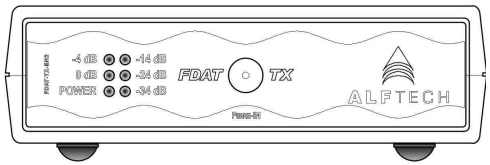
**Product Overview:** Fibre Digital Audio Transceiver

## *FDAT-TX EN2* the FDAT Transmitter

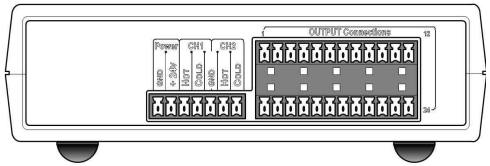
The FDAT-TX transmits 2 audio (optionally 4), and 24 digital inputs to the FDAT-RX Receiver via a fiber-optic cable. The Transmitter receives balanced audio inputs and converts it to digital format. This digital signal is combined with the 24 digital inputs, and then transmitted via fibre-optic cable to the Receiver. The digital inputs are active LOW. As an example, the Inputs can be connected to relay outputs or directly to switches.

The LED level indicator can be used to set the input audio to the appropriate level to prevent overdriving the analog-to-digital converters. The audio inputs has another 7 dB headroom from the time when the RED 0 dB LED lights up, before the audio output on the FDAT-RX Receiver will clip. The 0dB LED corresponds to +4dBu.

Front Panel




Rear Panel

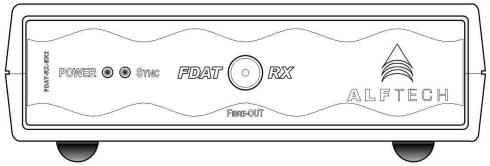



## *FDAT-RX EN2* the FDAT Receiver

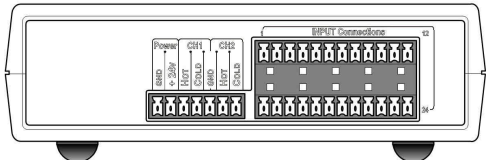
The FDAT-RX receives the data via the fibre-optic, and separates the audio data from the digital data. The 2 audio signals (optionally 4) are output via balanced line outputs. The digital outputs have a transistor pull down output.

If a relay is used, it must be connected between the output and the 24 V supply. If the fibre is not connected, or there is a fault with the FDAT-TX transmitter, the outputs will all be off, and the SYNC LED will be OFF. The fault output line will be ON (pulled LOW) in a fault condition.

Front Panel




Rear Panel






## *Hardware Features*

- 2 channels balanced audio (optionally 4)
- 24 inputs to transistor pull down outputs
- Line Fault transistor pull down output on FDAT-RX Receiver
- Audio level indicator for setup on FDAT-TX Transmitter

## *Functional Description*

The FDAT-TX EN2 is an audio-data fibre optic transmitter, in a Frame Mount form factor. Two audio channels and 24 digital inputs are transmitted to the FDAT-RX Receiver. The FDAT-RX Receiver will indicate if a valid link is maintained, and if not, a fault output will be activated. The audio will be muted, and all outputs will be switched off.

## *Transmitter Connections*

- 24 V DC supply input
- 24 inputs
- 2 Balanced audio line-inputs (optionally 4)
- Optic-Fiber output

## *Transmitter Indicators*

- Power LED
- 5 Input level Indicator LED's

## *Receiver Connections*

- 24 V DC supply input
- 24 pull down transistor outputs
- System fault pull down transistor output
- 2 Balanced audio line-outputs (optionally 4)
- Optic-Fiber input

## *Receiver Indicators*

- Power LED
- Data SYNC LED

## Hardware Ordering Options

| Part Number | Description |
|---|---|
| FDAT–EN2 | Frame Mount form factor, including all features as described above; |
| +ST | Select: **ST** Fibre Connecter (Standard), or **SMA** Fibre Connector; |
| +A | 2 additional audio channels |

# FDAT-EN2 Transceivers Specifications

## Recommended Operating Conditions

(0° C to + 55 °C)

| PARAMETER | CONDITION | MIN | TYP | MAX | UNITS | NOTES |
|---|---|---|---|---|---|---|
| Supply Voltage | | 20 | 24 | 28 | V | |
| Signal Input Voltage | | 0 | | 28 | V | |

## Absolute Maximum Ratings *

| | | | |
|---|---|---|---|
| Voltage on V Supply, Relative to Ground | 0 V | to | +34 V |
| Voltage on Signal input pins, Relative to Ground | –60 V | to | +60 V |
| Operating Temperature | 0 °C | to | +70 °C |
| Storage Temperature | 5 °C | to | +55 °C |

* Exposure to absolute maximum rating conditions for extended periods of time may affect reliability.

## Electrical Characteristics

(Over the Operating Range)

| PARAMETER | CONDITION | MIN | TYP | MAX | UNITS | NOTES |
|---|---|---|---|---|---|---|
| Supply Current | 24V DC – TX Transmitter | | 75 | | mA | 1 |
| | 24V DC – RX Receiver | | 90 | | mA | 2 |
| Trigger input Current | Input pulled to ground | | 5 | | mA | |
| Trigger input resistance | From 24V to trigger | | ~4.7 | | kΩ | |
| Trigger HIGH level Voltage | | 21 | | | V | 3 |
| Trigger LOW level Voltage | | | | 3 | V | 3 |
| Trigger input to output delay | | | | 10 | ms | 4 |
| Relay output Current | Transistor output pull down | | | 500 | mA | 5 |
| Audio Input and Output Level | 0 dB LED turns ON | | +4 | | dBu | 6 |
| Audio gain | Input to output | -0.25 | 0 | +0.25 | dB | |
| Audio headroom | | | 7 | | dB | 7 |
| Audio sample rate | | | ±44.5 | | kHz | |
| Audio resolution | | | 24 | | Bits | |
| Audio input impedance | TX Transmitter (differential) | | 24 | | kΩ | |
| Audio output impedance | RX Receiver (differential) | | 44 | | Ω | |
| Frequency response | ± 0.3 dB | 20 | | 20k | Hz | |
| Inter channel gain difference | | | ±0.25 | | dB | |
| LED indicator accuracy | | | ±0.5 | | dB | |
| Cross talk | 1kHz | | | >80 | dB | |
| Total Harmonic Distortion | +10dBu (1kHz) | | | <0.002 | % | |

## Notes

1. No audio input, and all triggers off. For every trigger another approx 5mA must be added.
2. The current is the supply current through the +24 V supply line. If all outputs are ON, the supply current should increase by less than 10 mA. This is because the relay outputs are pulled down, thus the relay current goes through the GND terminal.
3. The Signal input voltage should never be allowed to be between the maximum LOW-level, and the minimum HIGH-level input voltage.
4. Delay from when the FDAT-TX Transmitter received a trigger input, to until the FDAT-RX Receiver's output switches ON or OFF.
5. The relay outputs are in 3 banks of 8 outputs each. If all 8 outputs per bank are ON permanently, they are each allowed to draw only 125 mA. Only use 24 V relays, with a resistance of more than 200 ohm. Each relay output has a 22 k pull-up resistor and a protection diode connected directly to the 24 V supply.
6. The input and output level are between the hot and cold terminals.
7. Extra output level available before the output clips after the input level has reached the 0 dB level. Thus the output will clip at +11 dBu.



## Cautions

The output transistors do all have diode protection, but the outputs can still be damaged if care is not taken. When a relay is disconnected while an output transistor is on, and the relay has no diode directly connected to it, the relay will generate a high voltage oscillation, arcing over the point where contact was broken. This reverse voltage will flow back to the transistor and can damage it.

## Audio Inputs

The audio receiver uses a differential line receiver IC for the balanced inputs. For balanced inputs care must be taken to make sure the input impedance of the driver and cable is balanced. Just a few ohms can degrade the common mode rejection ratio considerably. If the inputs are driven by an unbalanced source, the input must be connected to the HOT input, and the COLD input must be grounded on the connector of the board.

The input must be balanced around the ground for best performance. If the board and the source are both grounded, the audio cable ground can be disconnected on the one end. Shielded twisted-pair cable is recommended for all applications. The screen must still be connected on the other end. This will avoid ground loops. All equipment must always be grounded to the safety ground of the building. Follow industry practices for proper system grounding of the cables.

## Input Levels

The LED display on the FDAT-TX Transmitter can be used to set the input levels. At any moment, the input with the highest input level will be displayed. When the 0dB LED lit up, the input level is +4dBu. The input has another 7dB of headroom, thus the signal will clip at +11dBu. For best audio performance the input level must be kept as high as possible without clipping the signal. The lower the signal, the lower the signal-to-noise ratio (SNR), and thus the higher the distortion. The LED'S are for indication only, and must not be used for level measurement.

## Outputs

The outputs are balanced, and impedance matched. The 2 outputs are both driven out of phase. They are not floating like a transformer output. If an unbalanced output is required, connect the ground to ground, and the signal to the HOT output. Leave the COLD terminal open. This will however give half the output level than a balanced output. The outputs can easily drive the large capacitive loads associated with long audio cables.

## Electrostatic Discharge

The inputs and outputs can be damaged by electrostatic discharge, thus care must be taken when handling the boards. Failure to observe proper handling and installation procedures can cause damage. Electrostatic Discharge damage can range from performance degradation to complete hardware failure.

# Physical Connection

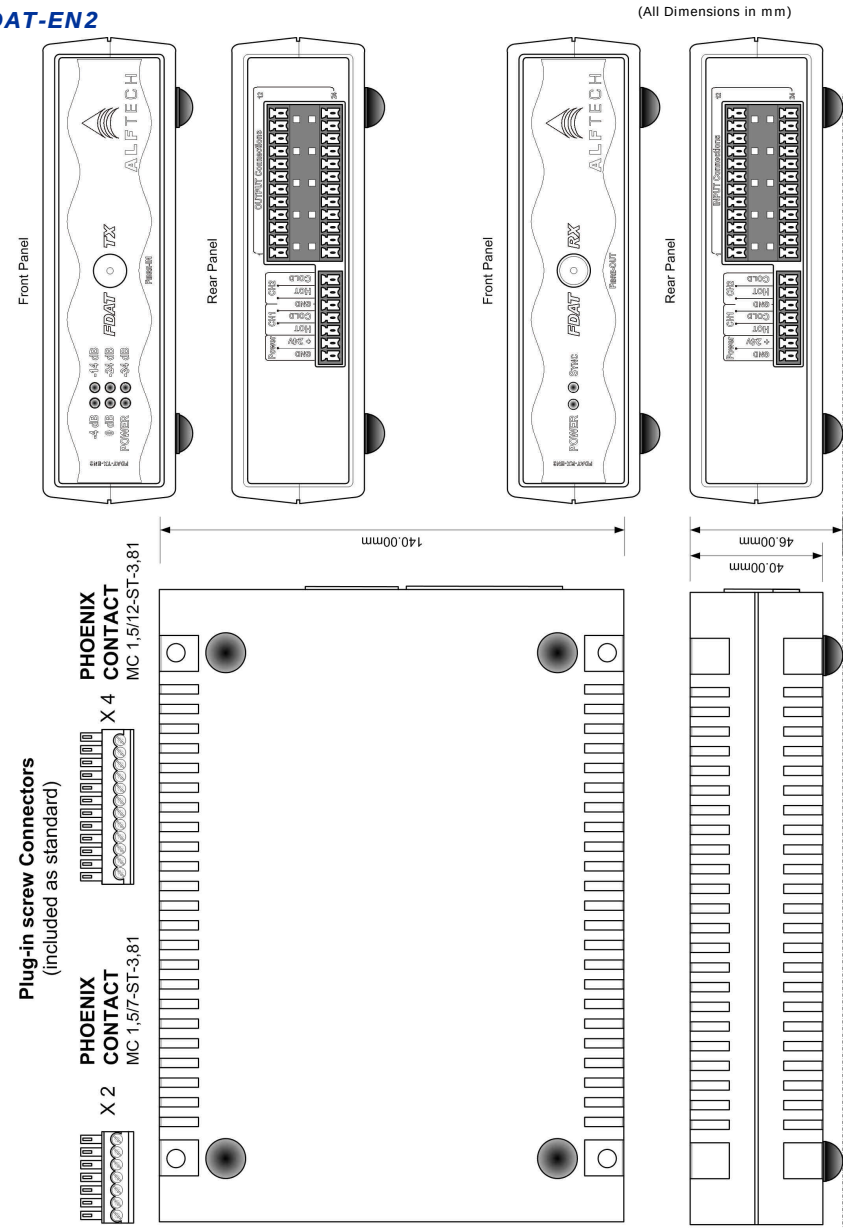
## PHOENIX Contact Connectors *(Supplied with the DAPP-EN2)*

The hardwired connections to the FDAT-EN2 are via sets of PHOENIX Contact 3.81 mm pitch connectors as shown in the following illustrations.

# Physical Layout and Dimensions

## *FDAT-EN2*

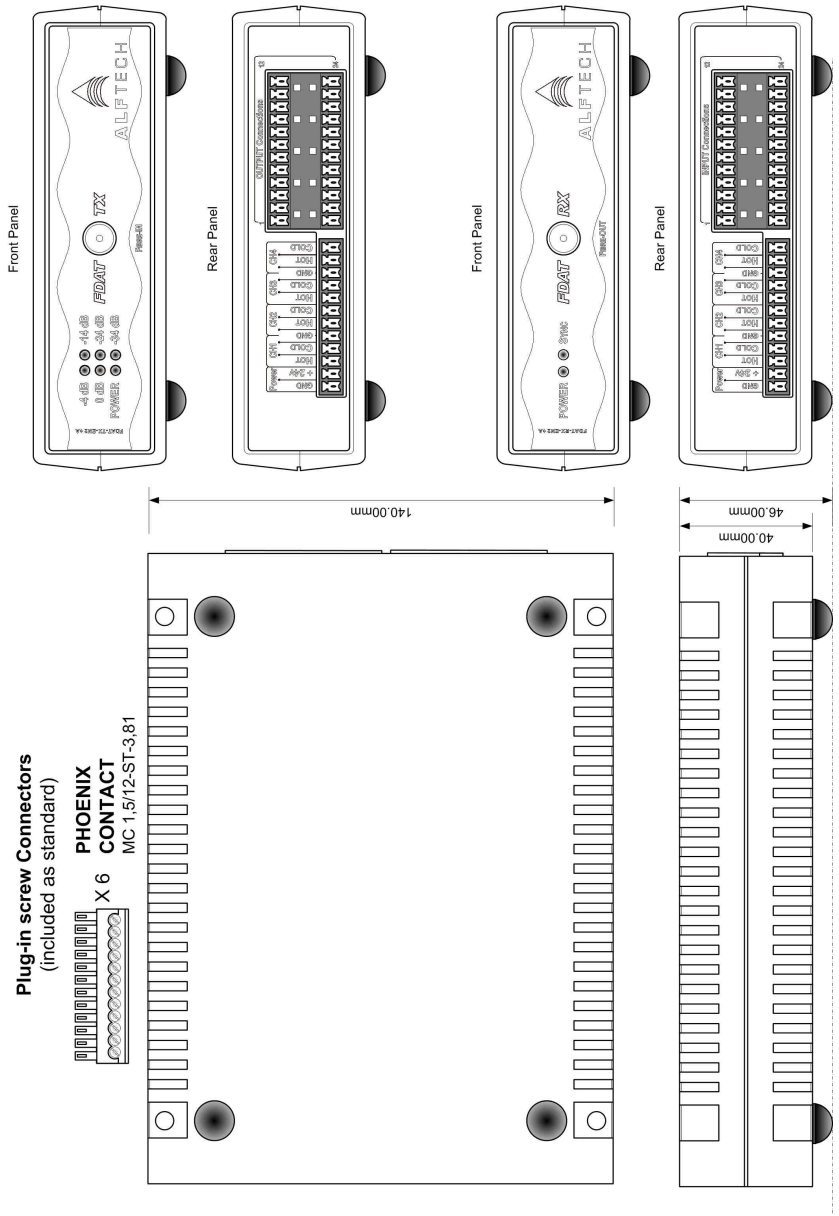
(All Dimensions in mm)






## *FDAT-EN2 +A*

(All Dimensions in mm)



## NOTES

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